AMENDMENTS TO THE CLAIMS

All claims are presented below with the respective status of each claim shown in parentheses after the claim number. Only those claims being amended herein show their changes in highlighted form, i.e., insertions appear as underlined text (e.g., insertions) while deletions appear as strikethrough text (e.g., ~~deletions~~). All previously amended claims appear as clean text.

1. (Original) A method of determining blood oxygen saturation comprising:

sensing physiological signals resulting from the attenuation of light of at least first and second wavelengths by body tissue carrying pulsing blood;

determining at least two values corresponding to oxygen saturation based upon at least two alternative methods of using the physiological signals; and

determining a resulting value for oxygen saturation from the at least two values corresponding to oxygen saturation.

2. (Original) The method of Claim 1, wherein the step of determining a resulting value comprises selecting from the at least two values at least one value that is a maximum among the at least two values.

3. (Original) The method of Claim 1, wherein the step of determining a resulting value comprises averaging at least some of the at least two values.

4. (Original) The method of Claim 1, wherein one of the alternative methods comprises at least one calculation in the frequency domain.

5. (Original) The method of Claim 4, wherein the calculation in the frequency domain comprises performing a Fourier Transform on the physiological signals.

6. (Original) The method of Claim 1, wherein at least one of the at least two alternative methods comprises a calculation based on a ratio of a normalized representation of the physiological signal resulting from the first wavelength to a normalized representation of the physiological signal resulting from the second wavelength.

7. (Original) The method of Claim 6, wherein at least one of the at least two alternative methods comprises a calculation based on the physiological signals after they have been effected by a recursive polyphase bandpass filter.

8. (Original) The method of Claim 6, wherein at least one of the at least two alternative methods comprises a calculation based on the physiological signals after they have been effected by an adaptive implementation of a recursive polyphase bandpass filter.

9. (Original) The method of Claim 6, wherein at least one of the at least two alternative methods comprises a calculation based on the physiological signals after they have been effected by a bank of filters.

10. (Original) The method of Claim 6, wherein at least one of the at least two alternative methods comprises a calculation based on the physiological signals after they have been effected by a sum of squares analysis.

11. (Original) The method of Claim 6, wherein at least one of the at least two alternative methods comprises a calculation based on a scan of possible saturation values.

12. (Original) The method of Claim 11, wherein the calculation based on a scan of possible saturation values comprises a discrete saturation transform.

13. (Original) The method of Claim 6, wherein at least one of the at least two alternative methods comprises a calculation based on determining values for saturation that minimize the correlation between a signal portion and a noise portion of at least one of the physiological signals.

14. (Original) The method of Claim 6, wherein at least one of the at least two alternative methods comprises a calculation based on the physiological signals after they have been effected by a Kalman filter.

15. (Original) The method of Claim 6, wherein at least one of the at least two alternative methods comprises a calculation based on the physiological signals after they have been effected by a neural network.

16. (Original) The method of Claim 6, wherein at least one of the at least two alternative methods comprises a calculation based on the physiological signals after they have been effected with spectral estimation techniques.

17. (Original) The method of Claim 6, wherein at least one of the at least two alternative methods comprises selecting at least one of the at least two values based on characteristics of the physiological signals indicative of the quality of the physiological signals.

18. (Original) The method of Claim 6, wherein step of determining comprises averaging the resulting value over time, said averaging dependent upon characteristics of the physiological signals indicative of the quality of the physiological signal.

19. (Original) The method of Claim 18, wherein the averaging is based on confidence in the quality of the physiological signals.

20. (Original) The method of Claim 19, wherein the confidence is determined by analyzing whether there is significant motion noise present in the physiological signals.

21. (Original) The method of Claim 6, wherein at least one of the at least two alternative methods comprises a calculation based on the physiological signals after they have been effected by an adaptive algorithm.

22. (Original) The method of Claim 21, wherein at least one of the at least two alternative methods comprises a calculation based upon a scan of values potentially indicative of said physiological parameter.

23. (Original) A method of determining pulse rate comprising:

sensing physiological signals resulting from the attenuation of light of at least first and second wavelengths by body tissue carrying pulsing blood;

determining at least two values corresponding to pulse rate based upon at least two alternative methods of processing the physiological signals; and

determining a resulting value for pulse rate from the at least two values corresponding to pulse rate.

24. (Original) The method of Claim 23, wherein the step of determining comprises selecting at least one of the at least two values based on a determination of confidence in the accuracy of physiological signals.

25. (Original) The method of Claim 23, wherein determining a resulting value comprises averaging the at least two values.

26. (Original) The method of Claim 25, wherein said step of averaging comprises averaging over a time window, wherein said window is increased for potential of said physiological parameter having a lower confidence of accuracy and decreased for potential values of said physiological parameter having a higher confidence of accuracy.

27. (New) The method of Claim 1, wherein each calculation technique relies on at least partially differing assumptions relating to at least one of the first and second intensity signals.

28. (New) The method of Claim 1, wherein each of the at least two alternative methods relies on at least partially differing strengths associated with that alternative method.

29. (New) The method of Claim 1, wherein each of the at least two alternative methods relies on at least partially differing behavior associated with that alternative method and dependent upon the first and second intensity signals.

30. (New) The method of Claim 1, wherein utilization of at least two alternative methods reduces an effect of motion induced noise on the resulting value for oxygen saturation.

31. (New) A method of determining a physiological characteristic of pulsing blood, the method comprising:

receiving first and second intensity signals from a light-sensitive detector which detects light of at least first and second wavelengths transmitted through body tissue carrying pulsing blood;

providing at least first and second calculation techniques, wherein each calculation technique is capable of generating at least one value representative of the physiological characteristic of the pulsing blood; and

utilizing at least one of the first and second calculation techniques to determine a resulting value indicative of the physiological characteristic.

32. (New) The method of Claim 31, wherein the physiological characteristic comprises a blood oxygen saturation.

33. (New) The method of Claim 32, wherein the resulting value comprises a ratio.

34. (New) The method of Claim 31, wherein the physiological characteristic comprises a pulse rate.

35. (New) The method of Claim 31, wherein the physiological characteristic comprises a plethysmographic waveform.

36. (New) The method of Claim 31, further comprising:

generating statistical information from at least one of the first and second intensity signals; and

utilizing the statistical information in the determination of the resulting value.

37. (New) The method of Claim 31, wherein at least one of the calculation techniques comprises a time domain technique and wherein at least another of the calculation techniques comprises a spectral domain technique.

38. (New) The method of Claim 31, wherein at least one of the calculation techniques comprises a time domain technique.

39. (New) The method of Claim 31, wherein at least one of the calculation techniques comprises a spectral domain technique.

40. (New) The method of Claim 31, wherein at least one of the calculation techniques comprises an adaptive algorithm.

41. (New) The method of Claim 40, wherein the first and second intensity signals are effected by the adaptive algorithm.

42. (New) The method of Claim 31, further comprising generating at least one output value from each of the first and second calculation techniques and wherein the utilizing comprises combining the output values to determine the resulting value.

43. (New) The method of Claim 42, wherein the combining comprises averaging.

44. (New) The method of Claim 43, wherein the averaging comprises performing a weighted average.

45. (New) The method of Claim 42, wherein the utilizing comprises selecting one of the output values to determine the resulting value.

46. (New) The method of Claim 42, wherein each output value qualifies for inclusion in the combining under different conditions of the first and second intensity signals.

47. (New) The method of Claim 31, further comprising evaluating the first and second intensity signals to obtain an indication of reliability for at least one of the first and second calculation techniques.

48. (New) The method of Claim 31, further comprising qualifying the at least one value as usable to determine the resulting value.

49. (New) The method of Claim 31, wherein each calculation technique relies on at least partially differing assumptions relating to at least one of the first and second intensity signals.

50. (New) The method of Claim 31, wherein each calculation technique relies on at least partially differing strengths associated with that calculation technique.

51. (New) The method of Claim 31, wherein each calculation technique relies on at least partially differing behavior associated with that calculation technique and dependent upon the first and second intensity signals.

52. (New) The method of Claim 31, wherein utilization of at least one of the first and second calculation techniques reduces an effect of motion induced noise on the resulting value.

53. (New) The method of Claim 31, wherein one of the at least first and second calculation techniques utilizes an algorithm that adjusts itself in response to changes in at least one of the first and second intensity signals and in response to an error signal to optimize at least one of the first and second intensity signals.

54. (New) A method of determining a physiological characteristic of pulsing blood, the method comprising:

receiving first and second intensity signals from a light-sensitive detector which detects light of at least first and second wavelengths transmitted through body tissue carrying pulsing blood; and

utilizing at least one of at least first and second calculation techniques to determine a value representing the physiological parameter.

55. (New) The method of Claim 54, wherein the physiological parameter comprises a blood oxygen saturation.

56. (New) The method of Claim 55, wherein the value comprises a ratio.

57. The method of Claim 54, wherein the physiological parameter comprises a pulse rate.

58. (New) The method of Claim 54, wherein the physiological parameter comprises a plethysmographic waveform.

59. (New) The method of Claim 54, wherein each calculation technique relies on at least partially differing assumptions relating to at least one of the first and second intensity signals.

60. (New) The method of Claim 54, wherein each calculation technique relies on at least partially differing strengths associated with that calculation technique.

61. (New) The method of Claim 54, wherein each calculation technique relies on at least partially differing behavior associated with that calculation technique and dependent upon the first and second intensity signals.

62. (New) The method of Claim 54, further comprising qualifying the value for inclusion into the step of utilizing depending upon different conditions of the first and second intensity signals.

63. (New) The method of Claim 54, wherein utilization of at least one of the at least first and second calculation techniques reduces an effect of motion induced noise on the value representing the physical parameter.

64. The method of Claim 54, wherein one of the at least first and second calculation techniques utilizes an algorithm that adjusts itself in response to changes in at least one of the first and second intensity signals and in response to an error signal to optimize at least one of the first and second intensity signals.

65. (New) A method of determining blood oxygen saturation, the method comprising:

receiving first and second intensity signals from a light-sensitive detector which detects light of at least first and second wavelengths transmitted through body tissue carrying pulsing blood;

based on a first technique, calculating a first possible value indicative of oxygen saturation of the pulsing blood;

based on a second technique different from the first technique, calculating a second possible value indicative of the oxygen saturation; and

determining a representative output value of the oxygen saturation based on the first and second possible values indicative of the oxygen saturation.

66. (New) The method of Claim 65, wherein at least one of the first and second techniques comprises a time domain technique.

67. (New) The method of Claim 65, wherein at least one of the first and second techniques comprises a spectral domain technique.

68. (New) The method of Claim 65, wherein the first technique comprises a time domain technique and the second technique comprises a spectral technique.

69. (New) The method of Claim 65, wherein at least one of the first and second techniques comprises an adaptive technique.

70. (New) The method of Claim 65, wherein each of the first and second techniques relies on at least partially differing assumptions relating to at least one of the first and second intensity signals.

71. (New) The method of Claim 65, wherein each of the first and second techniques relies on at least partially differing strengths associated with that technique.

72. (New) The method of Claim 65, wherein each of the first and second techniques relies on at least partially differing behavior associated with that technique and dependent upon the first and second intensity signals.

73. (New) The method of Claim 65, wherein the at least one of the first and second possible values qualify for inclusion in the determining the representative output value under different conditions of the first and second intensity signals.

74. (New) The method of Claim 65, wherein use of first and second techniques reduces an effect of motion induced noise on the representative output value.

75. (New) The method of Claim 65, wherein one of the first and second techniques utilizes an algorithm that adjusts itself in response to changes in at least one of the first and second intensity signals and in response to an error signal to optimize at least one of the first and second intensity signals.

76. (New) A method of determining blood oxygen saturation comprising:

receiving first and second intensity signals from a light-sensitive detector which detects light of at least first and second wavelengths transmitted through body tissue carrying pulsing blood;

determining at least two values indicative to oxygen saturation based upon at least two different methods of obtaining data from the first and second intensity signals; and

determining a resulting value indicative of oxygen saturation from the at least two values.

77. (New) The method of Claim 76, wherein each different method relies on at least partially differing assumptions relating to at least one of the first and second intensity signals.

78. (New) The method of Claim 76, wherein each different method relies on at least partially differing strengths associated with that different method.

79. (New) The method of Claim 76, wherein each different method relies on at least partially differing behavior associated with that different method and dependent upon the first and second intensity signals.

80. (New) The method of Claim 76, wherein at least one of the at least two values qualify for inclusion in the determining the resulting value under different conditions of the first and second intensity signals.

81. (New) The method of Claim 76, wherein use of at least two different methods reduces an effect of motion induced noise on the resulting value for the oxygen saturation.

82. (New) The method of Claim 76, wherein one of the different methods utilizes an algorithm that adjusts itself in response to changes in at least one of the first and second intensity signals and in response to an error signal to optimize at least one of the first and second intensity signals.

83. (New) A method of monitoring blood oxygen saturation of pulsing blood during motion induced noise, the method comprising:

receiving first and second intensity signals from a light-sensitive detector which detects light of at least first and second wavelengths transmitted through body tissue carrying pulsing blood; wherein the fist and second intensity signals include motion induced noise;

determining at least two values corresponding to oxygen saturation based upon at least two different methods of obtaining data from the first and second intensity signals; and

determining a resulting value for oxygen saturation from the at least two values corresponding to oxygen saturation.

84. (New) The method of Claim 83, wherein each different method relies on at least partially differing assumptions relating to at least one of the first and second intensity signals.

85. (New) The method of Claim 83, wherein each different method relies on at least partially differing strengths associated with that different method.

86. (New) The method of Claim 83, wherein each different method relies on at least partially differing behavior associated with that different method and dependent upon the first and second intensity signals.

87. (New) The method of Claim 83, wherein at least one of the at least two values qualify for inclusion in the determining the resulting value under different conditions of the first and second intensity signals.

88. (New) The method of Claim 83, wherein use of at least two different methods reduces an effect of motion induced noise on the resulting value for the oxygen saturation.

89. (New) The method of Claim 83, wherein one of the different methods utilizes an algorithm that adjusts itself in response to changes in at least one of the first and second intensity signals and in response to an error signal to optimize at least one of the first and second intensity signals.